

REMARKS

Favorable reconsideration of this application in light of the following remarks is respectfully requested. Claims 15-22 and 29-34 are currently pending. Claims 29 and 32 are amended by the present Amendment. Claims 1-14, 23-28, and 35-38 are canceled without prejudice or disclaimer of the subject matter therein.

In the Office Action dated March 17, 2004, claims 29-38 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,514,902 to Kawasaki et al. Further, claims 29-38 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,426,279 to Huster et al. The rejections of claims 29-34 are traversed for the following reasons. Further, claims 35-38 have been cancelled by the current amendment thereby making the rejection of claims 35-38 moot.

Applicants thank Examiner Booth for the courtesy of an interview granted to Applicant's representative, Jonathan A. Hack, on June 23, 2004. During the interview, Applicant's representative presented arguments detailing how the cited references do not disclose recited claims. The Examiner indicated he would reconsider the outstanding grounds of rejection upon formal submission of these amendments and remarks. Accordingly, Applicants now submit in this response the amendments and remarks previously presented to the Examiner during the interview.

The Rejection of Claims 29-34

In the Office Action, claims 29-34 were rejected under 35 U.S.C. §102 (b) as being anticipated by U.S. Patent 5,514,902 to Kawasaki et al. Further, claims 29-34

were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,426,279 to Huster et al. In view of the foregoing amendments and the remarks below, Applicants respectfully traverse these rejections.

Applicants respectfully assert that neither Kawasaki nor Huster disclose a method for forming a MOS transistor having a stressed region comprising, *inter alia*, implanting a species in the semiconductor beneath the MOS transistor channel region so as to form a stressed region comprising a portion of the MOS transistor channel region. Rather, Kawasaki implants a nitrogen species into regions adjacent to the gate structure using resist structure 12, sidewall oxide film 5, and isolation oxide film 2 as a mask. The implanted regions are shown as 7a and 7b in Figure 7 of Kawasaki. Following the implantation of the nitrogen species, the dopant used to form the source and drain regions is implanted. This is shown in Figure 8 of Kawasaki by implantation of boron to form regions 8a and 8b. A thermal anneal is then performed which causes the boron to diffuse outwards and the nitrogen to diffuse towards the surface of the semiconductor and inward to meet the boron. See col. 7, lines 13-29 and the regions 7a and 7b in Figure 9.

Examination of Figure 11 shows that the implanted nitrogen extends to a maximum depth of between 2.5 μm and less than 3.0 μm after the thermal anneal. Further, Figure 13 shows that boron extends to a depth of on the order of 3.0 μm at a concentration of 10^{16} cm^{-3} after the thermal anneal. As such, Figures 11 and 13 show that the nitrogen has migrated away from the channel region to reside in the source and drain regions while the boron has migrated outward toward the channel. Thus, the nitrogen and boron in the source and drain regions overlap after the thermal annealing.

Because the channel region starts where the boron concentration falls below that of the doping concentration in the channel region and because the maximum depth of the nitrogen is less than the depth of the boron, Kawasaki does not disclose a method of forming a MOS transistor having a stressed region comprising implanting a species in the semiconductor beneath the MOS transistor channel region. Accordingly, Applicants respectfully submit that claims 29 and 32 are in condition for allowance.

In addition, claims 30 and 31 depend from claim 29 and claims 33 and 34 depend from claim 32, and thus, are allowable for at least the same reasons that claims 29 and 32 are allowable, as well as for their additional recitations. Therefore, Applicants respectfully submit that claims 30 and 31 and claims 33 and 34 are also allowable over Kawasaki.

Applicants further submit that Huster fails to disclose, *inter alia*, implanting a species in the semiconductor beneath the MOS transistor channel region. Rather, Huster discloses introducing nitrogen or carbon near the top surface of the semiconductor 42 to form the diffusion cap layer 44. See col. 4, lines 18-22 and Fig. 2B items 42 and 44. Subsequently, Huster grows a low impurity concentration layer 46 on diffusion cap layer 44. See col. 4, lines 28-37. The low impurity concentration layer 46 forms the transistor channel region. Because Huster forms the channel region after introducing nitrogen or carbon, Huster does not implant a species in the semiconductor beneath the MOS transistor channel region. Accordingly, Applicants respectfully submit that claims 29 and 32 are allowable over Huster.

In addition, claims 30 and 31 depend from claim 29, and claims 33 and 34 depend from claim 32, and thus, are allowable for at least the same reasons that claims

29 and 32 are allowable, as well as for their additional recitations. Therefore, Applicants respectfully submit that claims 30 and 31 and claims 33 and 34 are also allowable over Huster.

Applicants respectfully request that this Amendment under 37 C.F.R. §1.116 be entered by the Examiner, placing claims 29-34 in condition for allowance. Applicants submit that the proposed amendments to claims 29 and 32 do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner. Therefore this Amendment should allow for immediate action by the Examiner.

It is respectfully submitted that entering the Amendment would allow the Applicants to reply to the final rejections and place the application in condition for allowance.

Finally, Applicants submit that entry of the Amendment would place the application in better form for appeal should the Examiner dispute the patentability of the pending claims.

In view of the foregoing amendments and remarks, Applicants respectfully request the entry of this Amendment, the reconsideration of this application, and the allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to the Texas Instruments Incorporated Deposit Account 20-0668.

Respectfully submitted,

Dated: July 9, 2004

By:


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